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Solution Combustion Route Synthesis of Ag doped $Co_{1-X}Gd_XO$ Nanocomposites and Evaluation of Antibacterial Properties

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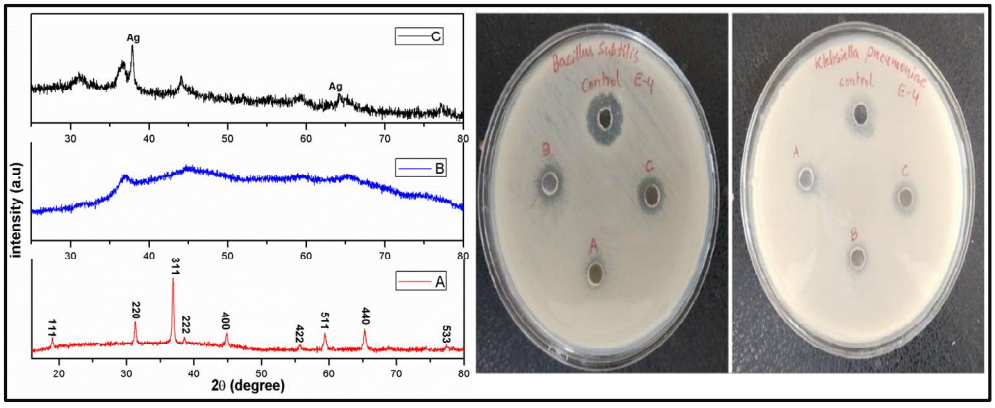
ABSTRACT

The unique size, composition and morphology dependent properties of nanocomposites are of great interest because they showed promising role in diagnostics and biomedicine. Combustion method has been used as a fast and facile method to prepare Ag doped $Co_{1-X}Gd_XO$ nanocomposite employing glycine as a combustion fuel. The products were characterized by X-ray diffraction technique (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM) techniques, and Fourier transformation infrared spectroscopy (FTIR). Experimental results of X-ray diffraction confirmed the formation of CoO phase with spinel Co_3O_4. Transmission electron microscopy indicated that the crystallite size of Ag doped $Co_{1-X}Gd_XO$ nanocomposite was in the range of 5-50 nm. The effect of gadolinium and silver on Co_3O_4 crystallite size and morphology has been discussed. Antibacterial activity of the Ag doped $Co_{1-X}Gd_XO$ nanocomposite was performed using well diffusion method on different pathogens Bacillus subtilis and Klebsiella pneumoniae. These nanocomposites able to resist the growth of bacteria successfully and emerged as a good antibacterial materials.

Graphical Abstract



Keywords: Ag doped $Co_{1-X}Gd_XO$ nanocomposite, Solution combustion method, Reactive oxygen species (ROS), Antibacterial activity.